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# EXPERIENCE OF THE AFRICAN REGION IN HOUSEHOLD SURVEY DATA ANALYSIS AND APPLICATIONS

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# I. INTRODUCTION

1. African countries have made considerable efforts over the last few years in the area of household survey data collection. However, the results of these surveys more often than not fall short of expectations, thus seriously limiting the scope of their use. With the exception of a few countries and fields, the analysis of these data is still at an embryonic stage.

2. The shortcomings identified include non-availability of results or, where they are available, they are obtained with considerable delays, inadequate supply to meet demand, poor quality of presentation or simply inadequate dissemination.

3. Apart from the shortage of qualified statistics personnel, the major cause of these deficiencies is attributable to poor data processing, coupled with improper arrangement of tables and poor organization of the collection and arrangement of questionnaires, resulting in serious losses.

4. Adequacy between statistical data supply and demand presupposes the establishment of constant dialogue and mutual understanding between producers and users. The ideal way of achieving this would be through an official framework. However, experience has shown that an informal approach based on solid ties among the various operators can be very effective.

5. There are, however, cases where the users are not identified or even ignored. Besides, the demands of the latter can be excessive and unacceptable. In the frequent case where the producer finds himself in a position of weakness vis-a-vis the user, consideration of inordinate ambitions can lead to aberration, if not failure.

6. This preliminary and general presentation of the issue may seem gloomy. However, it is a true description of the present African reality involving an area where considerable efforts will have to be made in the future.

7. It should be pointed out that household surveys cover a very wide range and deal on the one hand with the household itself or one of its members and, on the other, with the phenomena linked to household. The first includes demographic surveys (fertility, mortality, migration) and surveys on social conditions (housing, education, health, etc.) as well as income, expenditure and consumption. The second includes surveys on the economic behaviour of members of the household, particularly in relation to production: economic activity, employment and production in the informal sector. In a broad sense, the latter covers agriculture, game, gathering, fishing, processing and handicrafts.

## II. SOME CASES OF SURVEY DATA ANALYSIS AND USE

8. The usefulness of a survey is determined by the wide range of its users and the importance of the needs it satisfies. The data deriving therefrom constitute an essential tool for knowledge and decision-making. The major beneficiaries are therefore the decision-makers, planners and researchers. The latter belong to different areas of economic and social activities. Within the African context and considering the role devolving on the State, the primary user of household survey data is the administration. Other users include private enterprises, donors, co-operative bodies and even households.

9. Planning features prominently in administration. This seems to explain why in most African countries, national statistics departments are attached to the Ministry of Planning. However, this option has a few exceptions based on the statistical data requirements of other ministerial departments.

10. Results of household surveys are often published in the form of tables of figures with superficial comments. In-depth and systematic analyses are an exceptional case. However, they are of primary importance in so far as they increase considerably the use of survey data. The aim of such in-depth analysis is to establish the relationships among variables with a view to studying their interaction.

11. Since the purpose of this document is to serve as food for thought, it can neither be exhaustive nor perfect, nor even coherent. It will confine itself to the presentation of a few most widespread cases of data analysis in African countries. The themes selected relate to planning, economic accounts, food status, demand projection, food and index analysis.

12. It may be surprising to note that population study which is a major area of household survey is excluded from the list. The reason is that this subject is somehow ahead of those of economic and social nature. Indeed, in addition to comprehensive data on population distribution, most African countries have models of population projection and mortality tables.

### A. Planning

13. In most African countries, planning is regarded as a development framework. It prepares the projection of major aggregates: human resources (both in terms of quality and quantity), income (GDP), investment, consumption, foreign trade, price, employment, balance of payments. This is completed with guidelines on the methods to be used to arrive at a trend as close as possible to the preliminary forecasts.

14. As time went on, planning methods improved and expanded sectorally and regionally. This improvement has been possible through new statistical data input. In many cases, household surveys account for this to a large extent. However, much remains to be done as far as many areas are concerned, particularly those relating to household consumption, production in the informal sector, agricultural production in particular, employment and prices.

15. Recent economic development characterized by a quasi-general crisis in the aftermath of a relatively long period of property has once again brought to light the time-honoured nature of economic development comprising phases of prosperity, of crisis, of depression and of recovery. To be effective, planning should not be conceived on a linear pattern. It should be adjusted to the various phases of the economic cycle. The need for sensitive and fresh data, some of which are obtained from household surveys, is particularly felt under such circumstances. This does not involve an ad hoc mechanism but rather a permanent and flexible machinery.

16. In some countries like those in the Sahel, there is a permanent danger of crisis due to the vagaries of the climate which require early warning measures and the imperative need for harvest forecasts in order to pre-empt the devastating effects of drought.

17. Planning should also help resolve problems facing the most vulnerable groups of the population: women, children, ethnic groups living in remote areas or responding to change with difficulty.

18. In some countries, the crisis has resulted in the suspension of planning and its replacement with adjustment programmes. In some cases, the Ministry of Planning has been abolished. This indicates the need for flexible planning based on judicious analyses and constant flow of appropriate data. The contribution of household surveys is a determining factor.

19. Planning has its main sources of information. However, it relies mostly on areas which already possess relevant studies. All the cases presented in this document prove this. Nonetheless, the economic accounts input is a decisive factor.

## B. Economic accounts

20. National Accounts recapitulate economic activities over a one year period. They make it possible to identify the major aggregates:

Gross domestic product;
Household consumption;
Investments;
Intermediate consumption;
Savings;
National expenditure;
National disposable income.

21. They constitute a powerful tool for economic analysis and decision-making. The analyses they can generate include those relating to productivity, income distribution, consumer demand, attitude of subscribers to savings schemes and investment.

22. Most African countries prepare economic accounts using the United Nations System of National Accounts (SNA). However, some countries use other systems, particularly the expanded national accounting system (French SECN) and the Material Product System (Soviet CPM). In most cases and whatever the system used, the results which are approximate are published with considerable delays.

23. The inaccuracy is due to lack of reliable basic data. All the aggregates are consequently affected in varying degrees. Indeed, there is nothing surprising about this situation, considering the fact that the structure of African economies is generally subsistence-based and informal. Three types of survey at least are necessary to remedy the situation:

- Agricultural survey

- Budget/consumption survey

- Survey on the informal sector

C. Food status

24. Food status is an equation of stability between resources and the various uses of an agricultural product. Its main objective is to verify the consistency of the data contained in the various elements that make up the two parts of the equation.

25. The basic equation is R = E; R and E represent each the overall available supply.

We note:

Under resources

- Production (P)

- Stock variations (AS)

- Imports (I)

and under use

- Food for human consumption (H)

- Exports (E)

- Processing (P)

- Seedlings (S)

- Losses (L)

The equeation thus expanded gives:

$$P + AS + I = H + A + E + P + S + L$$

26. The more thorough the system the more reliable the data on the various elements. Some are easier to understand than others: imports, exports, processing.

27. In the absence of a survey on consumption, temporary substitute can be used. In the expanded equation, since the various elements are expressed in gross quantity, the net quantity is obtained by multiplying the gross quantity by the coefficient of extraction. With regard to cereals, the net quantity corresponds to the flour equivalent.

28. Several African countries use food status to verify the similarity and consistency of their data on food and agricultural products. The food status makes it possible to determine the shortage or excess of basic products.

D. Demand projection

29. The overall demand for a product depends on the number of consumers (N) and the average consumption of the individual (Y). The average consumption of a product increases according to the importance given to it by individuals and their financial resources. It is represented by the coefficient of elasticity (E) in relation to revenue (r):

$$e = \frac{\frac{\Delta Y}{Y}}{\frac{\Delta r}{r}}$$

$\frac{\Delta Y}{Y}$ is the rate of variation of Y

$\frac{Ar}{r}$ is the rate of variation of r

30. It means that if r increases by 1%, e increases by e%. The projection requires the formulation of the theoretical model Y = f(r) which corresponds better to the data observed. Three models have been tested for each of the products: double logarithmic model (LL), semi-logarithmic model (SL) and inverse logarithmic model (LI).

- Double logarithmic model (LL)

$$Y = Cr^{a}$$

Log Y = a log r + log c where e = a

- Semi-logarithmic model (SL)

$$Y = a \log + r + b \text{ where } e = \frac{a}{y}$$

- Inverse logarithmic model (LI)

$$\text{Log } Y = \frac{a}{r} + b \text{ where } \frac{a}{e} = r$$

31. African countries which have conducted consumption surveys use these methods. However, they are seldom used these days.

B. Food analysis

32. Food analysis consists in converting into calories and nutrients (proteins, vitamins ...), using an appropriate table (food consumption table), products consumed by an individual with a view to determining whether his diet is adequate or deficient, based on certain norms methodically established beforehand.

33. WHO, FAO and the United Nations University have established certain norms:

- basic metabolism equation according to weight and height;
- anthropometric norms for children and adolescents;
- median weight;
- gross energy expended while walking on plain ground;
- gross energy expended while performing certain activities.

34. Furthermore, FAO and the Department of Health, Education and Social Welfare of the United States of America have worked out a food composition table for use in Africa (1979 edition).

35. It should be pointed out that the food status of children constitutes an early warning indicator of the food status of the entire community. Indeed, children have low nutritional reserves and are the first to suffer from the effects of a general fall in the food resources of the community.

36. The case of Kenya regarding the use of household surveys to monitor the food status of the population can be cited as an example. During a workshop on household surveys organized by ECA in Lusaka, Zambia, in October 1984, the representative of Kenya said that analysis of household surveys in his country had made it possible to identify the appropriate indicators for monitoring and evaluating the nutritional effects of development projects at district level.

## F. Index analysis

37. An index analysis is a useful indicator for assessing the development of economic and social phenomena, and deciding on the measures to be taken. It is commonly used in most African countries to monitor the trend of household consumer prices. However, its scope is generally limited to the capital: its basis is often old and its weightings are seldom determined in a methodical manner, due to lack of surveys on budget and household consumption.

38. The area of application of index analysis no doubt transcends the narrow confines of price index. Indeed, it covers many other variables, particularly the value and volume in regard to many diverse fields: income, production, investment, savings, employment, birth rate, mortality rate... Though essentially meant for the analysis of chronological series, indexes are sometimes used for the study of spatial distributions such as the variation at regional level of per capita income or crop yields.

39. The study of agricultural and non-agricultural situation provides favourable indicators for index analysis for all African countries. Indeed, the economic and social situation is neither stable nor tied to a monotonous linear pattern. It is influenced by yearly and monthly fluctuations caused by the uncertainties of atmospheric conditions and variations in the economic phenomena, both internal and external. The drought which has affected a large number of African countries over the last few years and the current economic crisis are concrete examples.

40. In most cases, African countries do not have the means to cope with the situation. Indeed, they neither have adequate, reliable and current data, nor the relevant tools to determine the influence peculiar to the various economic and social variables and their inter-relationships. This shortcoming has

persisted at the time of the crisis and during the subsequent implementation of recovery measures known as "Structural Adjustment Programme".

41. The data that were most lacking were those on households. Generally the tools of analysis were of only interest with respect to enterprises in the formal sector and the administration. Even agriculture, a sector of primary importance in African economies, was left out.

42. AHSCP established during the period of relative economic prosperity placed emphasis right from the outset on classical surveys on structures. In the Sahel countries, however, the drought has compelled governments to focus their attention on the agricultural situation, using definitive or temporary data. The economic situation and the subsequent adjustment measures have heightened the need for a status report on all the economic sectors.

43. The experiments tried to-date do not seem to have produced the expected results, simply because they are not flexible enough. However, AHSCP has not given up. A study is underway with the aim of setting up a flexible and effective economic mechanism based initially on the monitoring of a household sample survey which will be extended as the various tasks of data collection, processing, analysis and dissemination have been properly mastered.

44. Indexes will play a primary role in the machanism to be established, as they are the best tool for economic analyses. The following will be mentioned by way of information:

- With regard to agriculture:
  - . Agricultural production index
  - . Index on the total number of heads of cattle
  - . Index on prices of agricultural products (plant, animal)
  - . Index on production input
  - . Index on prices of agricultural input.
- On the non-agricultural side:
  - . Index on household income and expenditure
  - . Index on household consumer price
  - . Index on the volume of household consumption

. Food index (calory content, protein content...)

. Index on living standard and hygiene

. Employment index

. Index on school population

. Index on access to medical care and pharmaceuticals

. Population index (population growth, birth rate, mortality rate)

. Index on immunization.

45. Since it is not possible to discuss in detail the methodological aspect in this document, mention will be made of only a few indexes and their models.

46. Chronological indexes are designed to highlight the variations in value, price or quantity. In all cases, their calculation always brings both price and quantity into play.

47. A value index is the ratio of the total number of values between the current year and the base year. The GDP index at current price or the salary index can be cited as an example. Its economic significance is limited on account of price variation. There is only one formula for calculating value index.

48. There are however three formulae for calculating price index, namely Laspeyres, Paasche and Fisher formulae.

49. Laspeyres index is an arithmetic average of basic price indexes of different products whose weighting coefficients relate to the base year. They are therefore fixed.

50. Paasche index is an harmonic average of basic price indexes with weighting coefficients relating to the current year. They are therefore variable.

51. Fisher index is the geometric average of Laspeyres and Paasche indexes.

52. With regard to quantity (or volume) indexes, the three formulae referred to above are used. Basic indexes, however, relate to quantities and not prices.

53. Laspeyres and Paasche indexes have their economic advantage. This is not the case with Fisher index. No theoretical consideration makes the first more important than the second. However, in view of the fixed nature of its weightings, Laspayeres index is easier to calculate than Paasche index. This explains why it is more frequently used. Paasche price index is used to determine the volume index based on the value index. Indeed, a value index is equal to the result of the Laspeyres volume index divided by Paasche price index.

## III. CONCLUSION

54. In view of the fact that the use of data obtained from household surveys is the very raison d'etre of the latter, analysed data represent the final product to be delivered to the users. Consequently, the analysis options constitute the starting point of household survey. Tabulation is derived therefrom, which is in turn used in data processing and preparation of questionnaires.

55. African statistical institutions are generally organized on a sectoral basis, with each sector corresponding to a specific area: population study, trade, price industry... Aspects of data integration are often incorporated into the unit in charge of national accounts.

56. A functional organization with a data collection and analysis division as its basis would make the system more effective. The other divisions will be responsible for data forecasting, operations and resources.

57. Who should be entrusted with the task of data analysis? Some people go to the extent of doubting the ability of the statistician to perform such a job, and prefer the services of specialists in the areas involved: economists, agronomists, nutritionists, sociologists, etc... Such an attitude is wrong. The statistician is not only a specialist of figures. His statistical training often involves economic training which enables him to carry out with ease the most difficult economic analyses.

58. It would be necessary that African statistics institutions develop their survey data analysis capacity and secure the co-operation of other government departments and research centres with a view to ensuring an effective performance of the above task. The results of the surveys should be made available to users as early as possible. Effective use of data presupposes

careful organization of publication and dissemination of survey reports. Steps should be taken to inform the users on the data available on tapes (magnetic tapes and disks or diskettes) but not published.

59. On the international plane, efforts should be intensified with a view to preparing manuals on analysis and use of data on various types of survey. The available literature on this subject is not very well documented.